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RESISTANCE OF DIFFERENT BEAN GENOTYPES (*Phaseolus vulgaris* L.) TO *Aphis craccivora* Koch, 1854

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INTRODUCTION

The black aphid (*Aphis craccivora* Koch, 1854, Hemiptera: Aphididae) is an important pest to the species of beans *Phaseolus vulgaris* L. and *Vigna unguiculata* (L.) Walp., due to its ability to cause damage by sucking of sap and the virus transmission as Cowpea aphid borne mosaic virus (CABMV), Blackeye cowpea mosaic virus (BICMV) and Bean common mosaic virus (BCMV) which lead to losses in production. The main control method has been chemical insecticides spraying, which often cause imbalance to the agroecosystem and can cause resistance problems. Thus it is desirable to look for more sustainable controlling methods, following the example of the use of cultivars that show some type of resistance. The study aimed to evaluate possible resistance of different genotypes of common beans *P. vulgaris* to the *A. craccivora*.

MATERIAL AND METHODS

The experiment was carried out in the period from May to July 2016 in a greenhouse at the Agronomic Institute of Paraná (IAPAR), Londrina, Paraná, Brazil. The air temperature and relative humidity were $25 \pm 4^{\circ}\text{C}$ and $62 \pm 10\%$, respectively. The genotypes of *P. vulgaris* evaluated were: Raz 49, IAPAR 81, IAC Alvorada, Negão, IPR Celeiro, IPR Tangará, MD 1133, IPR Curió and IPR Maracanã. The experimental design used was randomized blocks, with nine treatments (genotypes) and eight repetitions. Each plot consisted of a pot with two plants. The genotypes were sown in pots of 5L with a mixture of clay soil, sand and manure in the ratio of 2:1:1, respectively, plus 20 g fertilizer 4-30-10 (N, P₂O₅, K₂O) per pot. The aphids (*A. craccivora*), used in the study were obtained from IAPAR collection. When the genotypes were between flowering and early fruiting, the infestation was performed. On the leaf's abaxial surface of each plant four adult females were placed with the aid of a small cage. After seven days of the infestation, the leaf were detached from the plant and taken to the laboratory for the accounting of females and nymphs, verifying the aphids establishment success and the colonies development. The variable evaluated were: adult females number alive after seven days of infestation; viability (%), which corresponds to the percentage of females alive; total abundance, which corresponds to the sum of females alive plus the nymphs; adult females fecundity, obtained by dividing the number of nymphs by adult females. The data complied with the assumptions for parametric analysis and were submitted to analysis of variance and Scott-Knott test at 5% significance level.

RESULTS AND DISCUSSION

It was not possible to verify differences among the genotypes in terms of the number of females alive after seven days of infestation (Table 1). The genotypes Raz 49, IAPAR 81, IAC Alvorada, IPR Celeiro and IPR Maracanã had lower number of aphids by leaflets differing from other genotypes. The smallest amount of aphids in the genotypes aforementioned occurred due to lower females fertility, with the exception of genotype Raz 49, which is related to a lower number of females which survived during the period after inoculation, and resulted in a lower

number of nymphs (Table 1). Studies indicate different levels of resistance to *A. craccivora* for genotypes of *Vicia faba* L. and *V. unguiculata* (Laamari et al., 2008; Moraes and bleicher, 2007), interfering in the aphids colonies development. This interference can be related to the trichomes presence (Johnson, 1953) and plant height (Soffan and Aldawood, 2014). Moreover, the presence of tannins in groundnuts leaves reduces the fecundity of *A. craccivora* (Grayer et al., 1992), being the resistance occurrence by antibiosis checked for the cultivars of *V. unguiculata* (Obopile and Ositile, 2010). Future studies evaluating the anatomical and biochemical characteristics of the cultivars evaluated in this study may elucidate the resistance mechanism involved.

Table 1. Average number (N) of adult females, viability, total abundance and fecundity after seven days of infestation with *Aphis craccivora* in nine genotypes of common beans (*Phaseolus vulgaris* L.). Londrina, Paraná, Brazil, 2016.

Genotypes	Adult females		Total abundance (nymphs + females)	Fecundity (nymphs/ females)
	N	Viability (%)		
Raz 49	2.1*	53.1	51.9 b**	23.4 a
IAPAR 81	2.6	64.1	39.9 b	15.2 b
IAC Alvorada	1.9	46.9	27.8 b	15.9 b
Negão	2.8	68.8	71.3 a	24.7 a
IPR Celeiro	2.4	60.9	45.4 b	18.4 b
IPR Tangará	2.5	62.2	60.0 a	26.7 a
MD 1133	2.6	65.6	68.6 a	28.6 a
IPR Curió	2.6	65.6	60.9 a	22.6 a
IPR Maracanã	2.6	65.6	49.6 b	17.7 b
p-value	0.20	-	< 0.01	0.03
CV(%)	26.9	-	39.9	41.7

CV: Coefficient of Variation

* average values of 16 repetitions.

** Means followed by the same letter do not differ among themselves according to Scott-Knott test at 5% probability.

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